

CLAIMS

1. A magnetic field generating assembly comprising a set of, typically substantially coaxial, coils substantially symmetrically arranged about a plane orthogonal to the axis, wherein at least some of the coils carry working currents in the opposite sense to the other coils, the arrangement of turns and working currents carried by the coils being such that a first working volume with a substantially homogeneous magnetic field is generated within the envelope defined by the assembly, and two second working volumes each with a substantially homogeneous magnetic field are generated outside the envelope, the homogeneity of each of the first and second working volumes being sufficient to perform a NMR experiment on a sample in the working volume.
2. An assembly according to claim 1, wherein the size of the second working volume is less than the size of the first working volume for the same homogeneity.
3. An assembly according to claim 1 or claim 2, wherein all the working volumes are centred on the axis.
4. An assembly according to any of the preceding claims, wherein the coils are arranged in groups, members of each group being electrically connected in series.
5. An assembly according to claim 4, wherein the members of each group have substantially the same mean radius.
6. An assembly according to claim 5, wherein the mean radius of one group is different from the mean radius of another group.
7. An assembly according to any of the preceding claims, wherein one of the groups carries a working current in the opposite sense to another of the groups.
8. An assembly according to any of claims 5 to 7, wherein each group generates by itself a substantially homogenous magnetic field in the first working volume.
9. An assembly according to any of claims 5 to 8, wherein at least one of the groups comprises a central, coil or

coils and at least two end coils separated from the central coil(s) and arranged symmetrically with respect to the central coil(s).

10. A method of designing a magnetic field generating assembly, the method comprising defining an arrangement of three groups of coils which are substantially coaxial and each of which generates a substantially homogenous magnetic field within a first working volume at the centre of each group; and determining working currents which must flow through the groups of coils in order to generate a substantially homogenous region in a second working volume external to the assembly.

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